

1 Lilly

2 A F T E R N O O N S E S S I O N

3 1:42 p.m.

4 A R N Y S C L I F T O N L I L L Y, J R.,
5 resumed, having been previously duly sworn, was
6 examined and testified further as follows:

7 THE VIDEO OPERATOR: We are back on
8 the record at 1:42:15.

9 CONTINUED EXAMINATION

10 BY MR. PAYTON:

01:42:24 11 Q. Dr. Lilly, through the 1970s, through
12 that period, started back in '73 on the tobacco
13 side and you were there through the seventies,
14 was Dr. Dunn one of the principal scientists
15 throughout the period of the seventies?

16 A. My recollection is, yes, he was ~~the~~^a
17 principal scientist in the seventies.

01:42:46 18 Q. Do you know when he left the company?

19 A. I believe, memory again, that he left
20 the company in '88 or '89. I may be wrong there,
21 but, you know, sometime toward the end of the
22 eighties, if not into the nineties. But I seem
23 to remember more the late 1980s.

01:43:14 24 Q. And in this period I'm talking about,
25 which is just the seventies right now --

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2 A. Yes, sir.

01:43:20 3 Q. -- he was one of the principal
4 scientists. Was he held in high regard by the
5 people at the research center?

6 A. That's kind of difficult for me to
7 answer. I viewed Bill as an amiable guy and a
8 reputable scientist. I will give you my own
9 answer to that.

01:43:42 10 Q. All right. What was the opinion you
11 had?

12 A. It was not my field, obviously. I
13 don't know how he was viewed. In general ~~Generally~~ the
14 principal scientist position was viewed as a high
15 technical position in the laboratory.

01:44:06 16 Q. Did he play a role in you becoming an
17 associate principal scientist?

18 A. I must assume that he did, since, now
19 that I understand what happens in that role, he
20 had a vote on my becoming that.

01:44:24 21 Q. Do you know if he played a role in
22 you becoming one of the principal scientists?

23 A. Again, I must, from what I know now,
24 assume that he did, because he would have had one
25 of the votes for me going from associate

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2 principal to principal, yes, sir.

01:44:50 3 Q. In the seventies again, just in that
4 period, are you aware of any view that management
5 at Philip Morris had of Dr. Dunn?

6 A. I'm really not, no.

01:45:10 7 Q. Are you aware of any criticism of Dr.
8 Dunn during the seventies?

9 A. I'd have to answer the same way
10 there. I'm just not -- no one ever spoke to me
11 about anything.

01:45:24 12 Q. I asked you a few questions before
13 lunch about some reports that related to various
14 studies, a couple of studies relating to
15 nicotine.

16 A. Yes, sir, these.

01:45:38 17 Q. Yes. And you didn't recall, I don't
18 believe, two of those. One you had some input
19 and you remembered your role in that.

20 A. I remembered my role on one of them.
21 The other one I could not remember why I would
22 have been part of it, actually.

01:45:50 23 Q. Do you remember in this same time
24 frame, 1973, '74, around there, working on any
25 projects that related to nicotine delivery?

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2 A. The only ones that I -- I
3 concentrated on trying to understand flow,
4 combustion, pyrolysis and filtration, and in that
5 regard I think we've discussed, you know, what
6 came out of that type of report, about what phase
7 nicotine might have been in compared to tar.

01:46:26 8 Q. So in that context, you would have
9 worked on --

10 A. In that context, I would have worked
11 on it. I don't recall me working in any other
12 context, or whether someone would ask me to make
13 a calculation. That's possible. I don't
14 remember.

01:46:46 15 Q. And would that have been part of your
16 effort to come up with sort of a model of the
17 physical properties of the combustion and
18 ventilation and puff of a cigarette?

19 MR. MURPHY: I object to the form of
20 the question. You can answer.

21 A. I think part of what we attempted to
22 do in that group was to come up with some
23 understanding of what went on, and in that
24 regard, yes, we wrote down some equations and
25 tried to solve them. It was driven largely by

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2 trying to create an understanding, rather than
3 explicitly saying, well, this piece of work is
4 going to lead to a new product.

5 So it wasn't really basic, if you
6 understand basic, because it was really still
7 applied, but it was basic in the regard that we
8 were trying to look at a cigarette not
9 empirically, you know, as much as we could.

01:47:54 10 Q. And I think there was a reference in
11 one of the documents to the physical tobacco
12 project. Do I have the right -- physical
13 tobacco.

14 MR. MURPHY: Tobacco physics?

15 MR. PAYTON: Yes.

16 A. I thought of that. Tobacco physics
17 rings a bell with me, yes.

01:48:08 18 Q. That would have been the description
19 of all of these?

20 A. That would have been the description
21 of the project, and during the project there
22 would be some study of parameters, very wide,
23 about what happened. And as we discussed
24 earlier, even the -- pardon -- catalysis work
25 would have been part of that project.

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2 MR. MURPHY: Just to be clear, John,
3 by the project did you mean 1706, that had been
4 the subject of the prior testimony, identified as
5 the tobacco physics project in Exhibit --

6 MR. PAYTON: Yes, I was referring to
7 only the reference in one of these exhibits, the
8 exhibit that references on page 9.

9 A. That's the reference -- that's what I
10 was referring to, also.

11 Q. Yes, the tobacco physics project on
12 page 9 is referenced, and this is Lilly
13 Exhibit -- what number exhibit is that?

14 MR. MURPHY: Exhibit 3.

15 MR. PAYTON: Yes, 3.

01:49:18 16 Q. I was simply referring to the tobacco
17 physics project that is referenced in here, which
18 is identified with you in the report. Do you see
19 that, Dr. Lilly?

A. I see that.

01:49:30 21 Q. And is this what you were referring
22 to as 1706?

23 A. I'm referring to the charge number,
24 like 1600 on the front of this. If I recall, the
25 charge number for tobacco physics was 1706.

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2 (Lilly Exhibit 5 for
3 identification, inter-office memorandum from W.L.
4 Dunn to H. Wakeham, dated January 21, 1974.)

01:50:08 5 Q. I think there was a reference on one
6 of these annual reports to a C. Levy, Carolyn
7 Levy. She is the author of the July 9, 1976
8 annual report on behavioral research annual
9 report. Do you see that?

10 MR. MURPHY: I object to the form. I
11 don't think you mean to misspeak, John, but I
12 think she is identified as one of three authors.

13 MR. PAYTON: Yes, she is one of
14 three.

15 A. I read Frank Ryan, Carolyn Levy, and
16 B. Jones.

01:50:44 17 Q. Do you know Carolyn Levy?

18 A. Yes, sir, I know Carolyn.

01:50:50 19 Q. What was her expertise?

20 A. As I remember it, Carolyn had a Ph.D.
21 in psychology, and I don't remember whether I can
22 put experimental on it or just psychology. She
23 did obtain a Ph.D. in psychology.

01:51:12 24 Q. Did she at some point leave R&D?

25 A. As I remember, Carolyn left R&D

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2 twice. She left R&D, if I remember the first
3 time, to go into a position in New York that I'd
4 like to be able to tell you what it was but I
5 don't remember.

01:51:32 6 Q. Was it marketing?

7 A. It was, I think, surrounded somewhat
8 or dealing with marketing, or marketing
9 research. She came back and became the manager
10 of product evaluation division, which was one of
11 the R&D divisions under the new products group.
12 And then she left R&D again, and I believe she
13 did become the director or assistant director of
14 market research in New York.

01:52:12 15 Q. Do you know what she is doing now?

16 A. Yes, I do know. She went from market
17 research into the planning, business planning
18 department, as the director of planning, and in
19 that regard I dealt with her somewhat because I
20 had the responsibility for planning and R&D at
21 that time. She became the vice president of
22 planning. And she was recently promoted to
23 senior vice president -- I'm struggling for the
24 exact name so I can tell you the exact name.
25 It's a between marketing and sales -- I mean,

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2 it's a more broad planning, market research
3 role. And, I'm sorry, I don't remember the exact
4 name of that. But this happened maybe a few
5 months ago.

01:53:08 6 Q. Would you take what has been marked
7 in front of you as Lilly Exhibit 5, a three-page
8 document, a memo from Mr. Dunn to Mr. Wakeham,
9 dated January 21, 1974. It has production number
10 PA 828691 through PA 828693, or 1000731165
11 through 1167. This is a Philip Morris
12 inter-office memorandum.

13 Would you take a look at this and --

14 A. Can I just scan through it?

01:53:54 15 Q. I am going to direct you to
16 something. But, yes take a look at it. But if
17 you look at the second page, you will see on the
18 second page there is a reference to you and your
19 work, in the second full paragraph. So take a
20 look at the memo, and then you will see on the
21 second page there is a reference to you, and I am
22 going to ask you about both.

23 A. I'm reading the recommendation to me
24 right now, or the recommendation about me.

25 I finished the reference to me. Can

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2 I just scan the rest of it?

01:55:06 3 Q. Yes.

4 A. At least I scanned it. Sorry for the
5 time.

01:55:42 6 Q. The subject of the memo is the
7 request for cigarettes by the Tobacco and Health
8 Institute of the University of Kentucky. Are you
9 familiar with that institution, then or now?

10 A. Yes, I'm interested -- I'm familiar
11 with the University of Kentucky, and in context
12 to R&D, that they supply reference cigarettes, I
13 remember 2R1, for example, and I remember 1R4F.

01:56:16 14 Q. What are those?

15 A. Those are cigarettes that are
16 essentially reference cigarettes, at one a very
17 high tar level, and at the other something like
18 11 milligrams, that are used as control
19 cigarettes for testing, of chemistry, for
20 instance, coming out the end of the cigarette.

01:56:40 21 Q. Both those references that you just
22 made, are those to standard cigarettes that would
23 be produced for the purposes of an experiment or
24 a study?

25 A. Well, I'm not a great expert here,

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2 but I understand that those cigarettes are made
3 up and managed to the University of Kentucky so
4 that people doing experiments where they want a
5 control can have a supply of a standard cigarette
6 so their work at least can be brought back to the
7 same control.

01:57:16 8 Q. Did you understand that sometimes
9 those cigarettes were supplied by Philip Morris
10 or other tobacco companies?

11 A. I have heard, and this is only
12 through someone maybe, or maybe I heard a talk,
13 that they spread or rotate who makes those
14 cigarettes. Yes.

01:57:48 15 Q. And having skimmed this memo, do you
16 have any present recollection of this request for
17 cigarettes by the University of Kentucky's
18 Tobacco and Health Institute?

19 A. No, sir. I did find it interesting,,
20 I was mentioned here and I wasn't copied. But,
21 no, I don't. This is the first time I've ever
22 seen this memo.

01:58:08 23 Q. This memorandum does not show a copy
24 to you. Do you remember if you nevertheless
25 received the memo?

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2 A. I don't remember ever receiving this
3 memo.

01:58:18 4 Q. Go to the second page.

5 A. Yes, sir.

01:58:20 6 Q. Do you see the handwriting there?

7 A. Yes, I do see the handwriting.

01:58:24 8 Q. Do you recognize the handwriting?

9 A. No, sir, I don't.

01:58:30 10 Q. Now let's go to the paragraph that
11 has the reference to you, which is the second
12 complete paragraph on that page. It starts with
13 "I recommend that we not provide the
14 cigarettes." Do you see that?

15 A. Yes, I see that.

01:58:44 16 Q. And then it goes down to the first
17 reference to you, "Cliff Lilly's current work on
18 delivery changes as a function of flow rate."
19 I'm going to go through the whole thing, but I
20 actually want to stop there and ask you what your
21 then current work on delivery changes as a
22 function of flow rate was. Or do you --

23 MR. MURPHY: I object to the form of
24 the question, and I think it might be simpler if
25 you read the entire paragraph, but I will let the

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2 witness answer the question, and we can read the
3 rest of the paragraph in.

4 MR. PAYTON: I will read the whole
5 paragraph into the record, so that the record is
6 complete, and then I'm going to go through it bit
7 by bit.

8 THE WITNESS: Okay.

01:59:30 9 Q. The sentence that I want to ask you
10 about is as follows: "Cliff Lilly's current work
11 on delivery changes as a function of flow rate is
12 raising doubts about the validity of the nicotine
13 butt residual index, and the same group's
14 findings on the high delivery of high dilution
15 cigarettes under certain conditions are two
16 examples of potential error source, and Griffith
17 intends to use the nicotine residual butt
18 analysis measure as one of his several critical
19 indices."

20 Now, I want to ask about what your
21 then current work on nicotine -- on delivery
22 changes as a function of flow rate.

23 MR. MURPHY: I object to the form of
24 the question. I think you misspoke, John. It
25 says delivery, and your question said nicotine

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2 delivery.

3 MR. PAYTON: I changed it.

4 MR. MURPHY: But I'm not sure the
5 record as it is transcribed by the court reporter
6 picks that change up.

7 MS. ROBBINS: Why don't you just read
8 the question back?

9 MR. MURPHY: Perhaps you could
10 restate the question.

02:00:30 11 Q. Do you remember what your then
12 current work on delivery changes as a function of
13 flow rate was?

14 A. I think I remember, and I think we've
15 also talked about it. We were doing work on
16 combustion flow, filtration, diffusion, those
17 things to understand cigarettes. We had a
18 machine that was hand-built, it wasn't an FTC
19 machine or anything, where one could dial in the
20 flow. If you wanted to take a puff at a hundred
21 cc's per minute, you could, or if you wanted to
22 take one at 5,000 cc's a minute, you also could.

02:01:12 23 Q. You had a name for this machine, the
24 human --

25 A. We called it the multiple parameter

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2 smoking machine.

3 And so what I assume this memo is, or
4 what Dr. Dunn is talking about, is having heard
5 me give a talk sometime, or come up and see it, I
6 don't remember how, that it's simply what we
7 talked about before, that as you up the velocity
8 through a filter, its efficiency to remove
9 anything, tar, nicotine, water, anything,
10 actually goes down. And that would be what I
11 surmise is being talked about in that paragraph
12 that you just read.

02:02:08 13 Q. Do you recognize the term "delivery"
14 in there as describing what you have just said
15 you recall working on?

16 MR. MURPHY: I object to the form of
17 the question. You can answer.

18 A. What we do, of course, is we did
19 smoke cigarettes on the machine, and we would set
20 up a certain flow rate, one that we -- I mean,
21 for pulling something completely out of the air,
22 let me say 1500 cc's per minute. And we would
23 actually not smoke one, we would smoke four at a
24 time. And we would --

02:02:46 25 Q. On the machine? You would smoke them

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2 on the machine, you mean?

3 A. Those are on the machine, yes, sir.
4 So each time a puff was taken, and we did use the
5 protocol of doing it once per minute, that puff
6 would have a certain puff duration, and would
7 have a certain flow rate during the puff. In
8 other words, it would go up to here, and go that
9 far. And then if I doubled that, it would go to
10 here and go that far.

11 And each time we took a puff, we also
12 measured the position on the rod as a distance,
13 and what came out of that was delivery, which is
14 what we measured on a Cambridge filter pad behind
15 the machine, and that delivery we would weigh,
16 and so we would get a total number of milligrams,
17 and that was the extent of our analytical
18 ability. Anything else we would have to send to
19 the analytical lab and get.

02:03:52 20 Q. You would break it out into tar and
21 nicotine and moisture delivery?

22 A. That would be the reason for sending
23 it. We did a lot of work where we just weighed
24 it --

02:04:00 25 Q. And let somebody else do --

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2 A. No, we just said, look, what does TPM
3 do, and then in some cases we would send it down,
4 and back would come from analytical, water,
5 nicotine, and they left it to us to subtract and
6 get tar.

02:04:18 7 Q. I want to go to the next part of this
8 sentence, which refers to the validity of the
9 nicotine butt residual index. Do you know what
10 the nicotine butt residual index is?

11 A. Well, I know that I'm not an expert
12 with that, but I'll give you my criticism I think
13 I made at the time.

02:04:48 14 Q. Yes.

15 A. And I can't even give you full
16 details of who designed the experiment or how I
17 even heard of it.

02:04:56 18 Q. You are the expert in this room, I
19 can tell you that.

20 A. I may not even be in this room.

21 There was some attempt or some
22 experiment done to collect cigarette butts from
23 smokers. The reason I know that is I've had the
24 butts I had in an ashtray in the cafeteria taken
25 and put in a bag. And as I understand the

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2 premise of those experiments --

02:05:30 3 Q. This is science, right?

4 A. I prefer not to comment there, if I
5 may.

6 Was to measure the nicotine on that
7 filter, and then, by some sort of backward
8 calculation, calculate how much delivery a person
9 who smoked that cigarette would have gotten. And
10 I believe, and I'm fuzzy here, that it was based
11 on an FTC 1,050 cc per minute or 35 cc per puff
12 analysis. And I believe, again, and this is my
13 belief based on only memory, that it was to try
14 to get some handle on what kind of deliveries
15 people were getting, free and clear of wires
16 hanging on them and recorders hanging on them,
17 and this type of thing.

18 My criticism, I'll be happy to share
19 with you that, was that we had just done a long
20 series of the measurements that I previously
21 described on the multiparameter smoking machine,
22 in which we had measured the actual efficiencies
23 of cigarettes for various things as a function of
24 flow rate, since we had the capability to dial in
25 flow rate, and had shown wide efficiency

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2 variations, depending on what the flow may be.
3 For real low flows, I mean, the efficiency is up
4 in the sky, and for flows that are higher than
5 the 1050 FTC, the efficiency of the filter, as,
6 you know, not unusual if you look at aerosol
7 physics and filtration in general, like my
8 furnace filter, that the ability to filter
9 aerosol particles drops pretty rapidly with
10 velocity.

11 And so as you begin to have a flow
12 rate that was higher, then almost in an
13 exponential fashion the efficiency comes down.
14 And if you really go to extreme lengths, that
15 virtually no consumer would be interested in
16 anyway, but only to investigate a mechanism,
17 somewhere out here it would begin to go up, and
18 that's because you just don't follow the flow
19 stream, you just crash into things, and you don't
20 go around, called impaction.

21 I assume this is what Dr. Dunn was
22 talking about, because I do remember my criticism
23 of detecting what I smoked or anyone smoked, that
24 one had to know what the person's flow rate was
25 before they could go back to the filter and

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2 measure something and say "Yeah, that's how much
3 delivery came about."

02:08:40 4 Q. I'm trying to come up with sort of an
5 everyday description that would apply to a smoker
6 that would reflect the term you are using, which
7 is flow rate. Is that how hard someone would be
8 puffing on the cigarette?

9 A. No, I think it's -- if we can focus
10 on the FTC test for a second, a two-second puff
11 is 35 cubic centimeters.

02:09:10 12 Q. On their machine?

13 A. On their machine. When carried to 60
14 seconds, or continuous flow rate, it would be a
15 flow rate of 1,050 cc's per minute. And so when
16 I talk about flow rate, I mean I'm really talking
17 about a flow rate in cc's per minute. But one
18 has to realize that two seconds of that flow rate
19 are taken out and called a puff. But,
20 nevertheless, the flow rate during the puff would
21 be equivalent to 1050 or 1500 on our machine,
22 wherever you would set it. And then this would
23 establish the velocity of the smoke down the
24 cigarette rod and through the filter.

02:10:02 25 Q. And so the velocity at which the

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2 smoker would inhale the puff of smoke, measured
3 as a 60-second number, is the flow rate?

4 A. For a smoker it would be the
5 velocity -- I mean, it would be the volume that
6 he took on that puff, made into a flow rate by
7 knowing the cross-sectional area in which the
8 flow was being taken through.

02:10:40 9 Q. Yes.

10 And am I right in saying that the
11 criticism you had of the nicotine butt residual
12 index was that it presumed a uniform flow rate,
13 actually the FTC machine's flow rate, for every
14 single --

15 A. As I remember the --

16 MR. MURPHY: I object to the form of
17 the question. You can answer the question.

18 THE WITNESS: I'm sorry, I talked
19 before you even objected.

20 A. As I remember the experiment, it did.

02:12:06 21 Q. The next part of the sentence, I'm
22 just going along here, it says, "and the same
23 group's findings on the high delivery of high
24 dilution cigarettes under certain conditions."
25 Do you see that?

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2 A. Yes.

02:12:20 3 Q. I take it the reference to the same
4 group is a reference to your group?

5 MR. MURPHY: I object to the form of
6 the question.

02:12:24 7 Q. Do you know?

8 MR. MURPHY: If you know, you can
9 answer it.

10 A. I mean, just reading this, I assume
11 that that's what he means, yes.

02:12:32 12 Q. Do you know what is being described
13 when it refers to the same group's findings on
14 the high delivery of high dilution cigarettes
15 under certain conditions?

16 A. You notice I'm less sure of that
17 one.

18 We looked at, of course, dilution or
19 ventilation, also, and what I read from this, and
20 I don't really remember discussions of this as
21 much as I did the other one, that we were going
22 through the same type of parameterization, and we
23 would have done experiments that said, okay,
24 here's a ventilated cigarette, and we're going to
25 go with, you know, small puff volume all the way

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2 through to big puff volumes. And what that type
3 of experiment would do, intended for really
4 understanding a model of this thing, would
5 normally drive the volume through that cigarette
6 way over what it would be intended in actual
7 use. For instance, a 50 percent ventilated
8 cigarette might be expected to bypass 50 percent
9 of the flow in a puff through the filter, and
10 rather than getting 35 cc's, might have 17-1/2.

11 In an experiment where we were trying
12 to actually understand what was going on, and the
13 interactions, we may have put 90 cc's through
14 that cigarette, a sum of 3,000 cc's per minute,
15 you know, for a couple of seconds, or something
16 like that.

17 And I think it's quite - I mean,
18 there was no surprise to us that the delivery
19 went up as I put more volume through the
20 cigarette, because if I'm putting three times the
21 volume per puff through, it doesn't really matter
22 that half of it is going through the filter here,
23 I'm still having 45 cc's go through ~~an oxidized~~
24 carbon and release heat, and that's greater than
25 the FTC 35 cc's.

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2 That would be the only thing, the
3 only way I could add any more than I remember. I
4 mean, that's what I remember what we did.

02:15:16 5 Q. You said you were part of a study as
6 a subject to determine something about puffs, and
7 you walked around with a bunch of measuring
8 devices on, I take it. Do you recall this?

9 MR. MURPHY: I object to the form of
10 the question. The testimony speaks for itself.
11 You can answer the question.

12 A. Yes, I did say that, and I do
13 remember doing that.

02:15:40 14 Q. Did that result in a paper or a
15 report on what actual smokers' puff history was?
16 What was the point of that experiment?

17 MR. MURPHY: I object to the form;
18 compound. You can answer the question, if you
19 understand what you are being asked.

20 A. Number one, I don't remember whether
21 that resulted in a peer reviewed paper or
22 something. As I understood the experiment, there
23 was -- and it reads kind of like this paragraph
24 in a way -- that there was some research work
25 going on to determine how cigarette smokers

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2 actually puffed on cigarettes, what was their
3 duration, interval and flow rate.

02:16:34 4 Q. And how that might change from smoker
5 to smoker?

6 A. I don't remember how many smokers
7 were part of that, or how many machines they
8 had. I do remember at least one occasion when I
9 wore the machine in my hip pocket and had a
10 Bernoulli ~~Bernoulli~~ tube holder where I put my cigarettes in
11 and smoked.

02:16:58 12 Q. Do you remember if you were asked to
13 smoke different types of cigarettes as part of
14 that experiment?

15 A. You know, I don't remember that. I
16 mean, I do remember that we had little bags that
17 we put the cigarette butts in. I don't
18 remember. I'm a Marlboro smoker, by the way. I
19 don't remember whether I was asked to smoke
20 others, I just don't. And I don't remember how
21 many times I did it. I certainly remember one,
22 maybe two times that I did that.

02:17:32 23 Q. The machine that was developed by
24 your team, that smoked cigarettes four at a
25 time --

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2 A. Yes, sir.

02:17:44 3 Q. -- did it have variability as far as
4 the velocity of puffs it took? That is, could
5 you change it?

6 MR. MURPHY: I object to the form.

7 You can answer, if you understand the question.

8 A. I think I understand the question.
9 And as I remember the machine, which was
10 constructed in our own building, or shop, there
11 were four ports, so-called. Each of the ports
12 had a flow rate meter on it. And so before you
13 started the experiment, you could --

02:18:20 14 Q. Set it?

15 A. You could open a valve and set that
16 meter to read 500 cc's per minute, it was a mass
17 flow meter, or 2,000 cc's per minute, and that
18 could be done -- actually there was only one flow
19 meter. You then switched the next port to the
20 flow meter, and you set those ports with a
21 valve.

22 And if I remember correctly, also, we
23 had a valve that you could also dial in time.
24 You could dial in two seconds for a two-second
25 puff, or you could dial in one and a half

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1 | Lilly

2 seconds, or you could dial in a longer than
3 two-second puff, maybe two and a half seconds.
4 And that was, again, a thumb switch, that you
5 dialed in the digital number.

I might add, this was very unlike FTC
smoking machines. I mean, this was a
research-type smoking machine.

02:20:08 12 Q. Dr. Lilly, you have just been handed
13 what's been marked Lilly Number 6, a letter dated
14 July 12, 1974, from Robert Seligman to Dr. Max
15 Hausermann. It has production number PA 812805,
16 or 000258120.

17 Do you know who-- You knew Robert Seligman, I take it?

18 A. Yes, I know and do know Bob Seligman.

02:20:48 19 Q. He was identified at that time, 1974,
20 as the director of commercial development -
21 tobacco products. Is that within R&D? Was that
22 within R&D?

23 A. You know, I don't remember whether
24 that was in R&D or not. That may have been a
25 commercial development job in New York. I'm

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1 Lilly

2 sorry, I kind of tend to think it was in New
3 York, but it could have been in R&D.

02:21:20 4 Q. It shows as New York. The
5 letterhead, if you look at the top, shows that
6 it's New York.

7 A. I tend to think it was a New York
8 position, yes.

02:21:28 9 Q. I want to direct your attention to
10 the second paragraph, which refers to you and
11 Claflin. Do you see that?

12 A. Yes, sir.

Q. Why don't you just take a look at
that.

15 A. Okay. Yes.

02:22:38 16 Q. This is a reference to a discussion
17 that Mr. Seligman had with you and Claflin.
18 Claflin was someone who worked on your team?

19 MR. MURPHY: I object to the form of
20 the question. You can answer.

21 A. Warren Claflin worked on the
22 combustion flow and filter efficiency thing, yes,
23 sir.

Q. Do you recall having this discussion, that Mr. Seligman is referring to, in 1975?

1 | Lilly

2 A. I recall discussions with Bob. I
3 don't recall this particular one, but I do recall
4 discussions about the physics of what we were
5 doing with Bob. I don't know about this
6 particular one.

02:23:22 7 Q. This seems to be talking about
8 research center studies on human smokers. Do you
9 see that?

10 A. I see the "At the Research Center
11 people are --". Is that the third paragraph? Is
12 that where you want me to look?

00:23:36 13 Q. Yes. Yes.

14 A. At 60 cc's per puff with a flow rate
15 of 1800.

02:23:42 16 Q. And actually in the previous
17 paragraph there is a similar reference to, in the
18 last sentence, research center studies on human
19 smokers.

20 A. Yes, sir.

02:23:52 21 Q. Do you recognize those references to
22 studies on human smokers as the study that you
23 were a subject in, or something else?

24 A. Well, I don't know. But I do know
25 that what I described that I smoked on would have

1 Lilly

2 given values in peak flow rates and volumes. I
3 don't know for sure, but in my own mind I guess I
4 would relate those to the same thing.

02:24:20 5 Q. Did you conclude, on the basis of the
6 studies that you were doing on the machine, that
7 the FTC smoking machine was underreporting what
8 was actually being puffed by smokers?

9 MR. MURPHY: John, I object to the
10 question. I had given you some latitude here
11 with respect to the subject of smoking machines.
12 I think, though, that the judge ruled on May 17
13 that the question of whether the FTC test is an
14 accurate test, is the best test, is a test of
15 human smoking, is simply a comparative
16 benchmark. The subject of the FTC test, which
17 was the subject of an all-documents document
18 request by ABC, is I think in principle not a
19 subject into which the judge has found there to
20 be relevant or discoverable matter.

21 I will let the witness answer the
22 question, but I think that you are going very far
23 afield from what the rulings of the case deem to
24 be relevant areas of inquiry, and I would urge
25 you to move on to appropriate areas of

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1 Lilly

2 questioning.

3 THE WITNESS: What do I do?

4 MR. PAYTON: I'm going to ask you the
5 question again.

02:26:24 6 Q. At this time, this is 1974, was it
7 significant that the research center seemed to
8 have concluded that people were smoking at an
9 average rate of 60 cc's per puff, when the FTC
10 machine was smoking at the rate of 35 cc's per
11 puff?

12 MR. MURPHY: I object to the form of
13 the question. You can answer it, Dr. Lilly.

14 A. I mean, we've been talking a couple
15 of other times about recorders, and I think, to
16 the best of my memory, I said I smoked with a
17 puff rate of cc's per puff of 50. I don't
18 remember the flow rate involved in mine. I do
19 remember that I was slightly under two seconds,
20 but close to two seconds, and had several puffs
21 less than the FTC. I mean, I always viewed, in
22 my personal opinion, that the FTC setup, or test,
23 was only for nominal ranking, that I don't
24 remember seeing very many people that time their
25 between-puffs to one minute. I know me as a

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1 Lilly

2 smoker, if I were smoking now, might take three
3 in 30 seconds, and I might then let the cigarette
4 burn up. I always viewed it as a ranking.

5 It's kind of interesting, too, that
6 the kind of work we were doing in physics, which
7 was actually done only for understanding how
8 things happen in pyrolysis in cigarettes, seems
9 to be being used in much more wide ways than it
10 was intended.

11 I'm not surprised that people smoked
12 different than the FTC method, by the way. But I
13 also have no concept of what they're going to get
14 out of the cigarette, I mean, absolutely none. I
15 don't know what I got. I would guess, from just
16 what I know, it was less than 16 milligrams. But
17 I have no idea. I mean, there's so many
18 variables there. The size of mouth, or how
19 people smoked. I mean, that's my personal
20 feeling about the FTC test.

02:29:14 21 Q. The point of the research that you
22 and your team were doing was to better understand
23 how smokers smoked?

24 MR. MURPHY: I object to the form of
25 the question.

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1 Lilly

2 I would also just add, Mr. Reporter,
3 that it was my objection to the prior question,
4 not Ms. Robbins. I'm sure I suppose that will be cleaned
5 up subsequently.

02:29:42 6 Q. Dr. Lilly, did you understand my
7 question, that it was whether or not the research
8 that you and your team were conducting regarding
9 flow rate and puffs, was that directed towards
10 having a better understanding of how human
11 smokers --

12 A. No, the physics people we had were
13 very far away from psychologists. We were
14 interested in knowing rates of removal, we were
15 interested in knowing condensation functions, we
16 were interested in knowing rates of oxidation. I
17 mean, I think if you read those reports you would
18 see that we were very much the physics guys with
19 the pointed hats on.

20 (Lilly Exhibit 7 for
21 identification, inter-office correspondence to
22 W.L. Dunn from F.J. Ryan, dated August 16, 1974.)

02:31:06 23 Q. Dr. Lilly, you have just been handed
24 what's been marked Lilly Exhibit Number 7, a memo
25 from F.J. Ryan to W.L. Dunn, dated August 16,

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1 Lilly

2 1974. It has production number PA 816165 through
3 PA 816170, or 1003295088 through 5093. I'm sure
4 that's incorrect -- yes, that's right.

5 And if you notice, on the fourth
6 page, which is where the cc's are, you will see
7 that you are one of the persons who is copied on
8 this. Do you see yourself at the bottom there?

9 A. Yes, I do.

02:32:06 10 Q. Why don't you take a look at this.

11 A. Can I look at it a second?

02:32:08 12 Q. Yes.

13 Do you remember this memorandum?

14 A. I see my name is on it. I don't
15 remember it, by the way, explicitly. But I'm on
16 the distribution list, yes, sir.

02:35:30 17 Q. Do you remember what is being
18 referred to in this memorandum, anyway, as
19 experiment puff 6?

20 A. No, sir, I don't remember that
21 language.

02:35:56 22 Q. Let me ask you to turn to page 4.

23 A. Okay.

02:36:00 24 Q. Page 4 has at the top a heading
25 called "Comments." Do you see that?

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1 Lilly

2 A. Yes, sir.

02:36:06 3 Q. It reads, "These observations

4 strongly support the dose hypothesis." Are you
5 familiar with the dose hypothesis?

6 MR. MURPHY: I object, John. I think
7 that's a sentence that you are taking out of
8 context. I think you should read the entire
9 paragraph, and indeed I think really that you
10 should read the whole page into the record, but I
11 will let you do that a piece at a time, if that's
12 the way you want to do your examination.

13 MR. PAYTON: He read the memo. I
14 just want to know if he understands what the
15 reference to dose hypothesis is.

16 A. I don't know what dose hypothesis
17 means. It's not the language, my language. I
18 don't know what that means.

02:37:18 19 Q. Are you familiar with a hypothesis
20 that says that smokers will adjust their puff
21 volumes in order to compensate for a change in
22 the tar and nicotine content of the cigarette
23 they are smoking?

24 A. I've heard it some time, and I'm not
25 sure exactly, maybe it was in the literature,

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1 Lilly

2 maybe someone told me, that hypothesis, yes, sir.

02:37:52 3 Q. Were you aware of any studies
4 conducted by persons at the Philip Morris
5 Research Center to prove or disprove that
6 hypothesis?

7 A. I don't recall ever being involved in
8 any studies to do that. Awareness? I don't
9 remember explicitly that.

02:39:04 10 Q. Are you familiar with a study that is
11 entitled "A Long-Term Switching Study"?

12 A. No.

02:39:48 13 Q. Dr. Lilly, what is your knowledge as
14 far as the role that nicotine plays, if any, in
15 smokers continuing to smoke?

16 A. I know nicotine is, in general, in
17 part of what is in the smoke in cigarettes. I'm
18 certainly not qualified to talk about nicotine
19 pharmacology at all. I'm very far away from
20 that. I am a smoker. I don't smoke cigarettes
21 on weekends or at nights after I leave work.
22 That's been one of my characteristics for many
23 years. I don't have a real good feel for what I
24 smoke cigarettes for. My guess would be it's not
25 for nicotine, since I can go for a long time

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1 Lilly

2 without smoking them. My guess is I like to have
3 something in my hands, like I eat my glasses.
4 But I'm not a nicotine pharmacologist, not at
5 all.

02:41:04 6 Q. Are you familiar with research that
7 has been conducted at the Philip Morris Research
8 Center on the question of what role, if any,
9 nicotine plays in why smokers continue to smoke?

10 A. Nothing comes to mind. I mean, I
11 certainly -- I mean, I've heard talks given on
12 nicotine by scientists visiting. I don't
13 remember explicitly, and that's my own memory.
14 That doesn't say that there's not documents.

02:41:52 15 Q. You don't recall any reports or
16 studies on that question?

17 A. On nicotine -- say the question
18 again, if I might ask.

02:42:04 19 Q. The role that nicotine plays, if any,
20 on why smokers continue to smoke.

21 A. I'm sorry, I don't explicitly
22 remember those documents as I sit here today. I
23 remember we had a denic cigarette. I was part of
24 that.

02:42:30 25 Q. That's in the 1980s, late 1980s?

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1 Lilly

2 A. Mid eighties, yes, sir.

02:42:44 3 Q. Let me ask take you take a look at, I
4 believe, what was marked as Lilly Exhibit 2. I
5 may be wrong about that. It is the report that's
6 dated November 1971.

7 A. Yes.

02:43:06 8 Q. And this is the research center
9 report that has you on the distribution but that
10 you did not recall.

11 A. I'm still trying to think about why I
12 was on the distribution list. But I do see I'm
13 on the distribution list.

02:43:22 14 Q. I was asking if you had seen any
15 reports, and I understand you didn't recall
16 seeing this, but do you recall seeing any reports
17 like this, "Why does the smoker continue to
18 smoke"? I'm just reading from the introduction, *read to*
19 the same two sentences I read to you. *I*
you

20 A. Yes, right.

02:43:38 21 Q. You don't recall seeing any other
22 reports or studies like this on this subject, why
23 does the smoker continue to smoke?

24 A. I mean, I don't recall while I'm
25 sitting here. You know, in fact, I didn't recall

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1 Lilly
2 this one. That is not to say that I didn't get
3 circulated reports. I do remember hearing some
4 visiting lectures talk about nicotine. It's been
5 more recently than in the seventies, by the way.
6 It wasn't a subject that was at the top of my
7 agenda during those early days. And I'm still --
8 I wish I could tell you why I was on this report,
9 this one. I don't know. I don't know whether I
10 was a subject -- maybe I was a subject.

02:44:26 11 Q. You don't recall research that came
12 out one way or the other?

13 A. I don't recall one way or the other
14 whether I had reports like this. I don't
15 remember this one.

02:45:18 16 Q. Do you recall any reports that
17 referred to the possibility that nicotine level
18 was related to the competitiveness, competitive
19 ability of a cigarette in the marketplace?

20 MR. MURPHY: I object to the form of
21 the question. You can answer it.

22 A. I'm trying to think. I don't
23 remember any.

02:46:10 24 Q. Did you ever have conversations with
25 Dr. Dunn about any of his views or theories or

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1 Lilly

2 hypotheses regarding nicotine's role in why
3 people smoke and continue to smoke?

4 A. I really didn't know Dr. Dunn very
5 well early. When we were both principal
6 scientists, I knew that Dr. Dunn had the
7 hypothesis that consumers smoked for nicotine,
8 and I did have arguments with him, unscientific
9 that they may be, that I didn't believe that.
10 And those were based on my own views, based on my
11 own experience.

12 I don't recall at the time he retired
13 from the company that either person changed their
14 views. He was an advocate for nicotine; I do
15 understand that.

02:47:16 16 Q. Did you understand his theory to be
17 that all smokers smoke because of nicotine or
18 that some smokers smoke because of nicotine?

19 A. I understood his thesis to be that
20 the majority of smokers smoke for nicotine.

02:47:32 21 Q. And, therefore, your personal
22 experience wasn't necessarily inconsistent with
23 his theory?

24 MR. MURPHY: I object to the form.
25 You can answer.

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1 Lilly

2 A. In that I could be an outlier, that's
3 correct.

02:47:58 4 Q. I have to tell you, that's a term I
5 don't use, but I like it, an outlier.

6 Dr. Lilly, did you see the Day One
7 broadcast that is at issue in this litigation?
8 It ran on February 28, 1994.

9 A. As I remember, I saw the last part of
10 the broadcast. I did see the entire one this
11 week, when I was sitting with our counsel here.

02:48:48 12 Q. You reviewed it in preparation for
13 your deposition?

14 A. I watched it in its entirety. I
15 hadn't watched it in its entirety before.

02:49:00 16 Q. Do you recall now that there were, I
17 believe, several quotations from Dr. Dunn with
18 respect to cigarettes being nicotine delivery
19 devices? Do you recall that?

20 MR. MURPHY: I object to the form of
21 the question. I think that the question is not
22 intended to be misleading, but I think it
23 actually is inaccurate. "Several" is, I think,
24 an overstatement, to say the least.

25 MR. PAYTON: I will read from the

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1 Lilly

2 transcript of the broadcast, and I will just read
3 the references.

4 MR. MURPHY: That would be fine.

02:49:36 5 Q. It's one little paragraph, and I will
6 read the paragraph. You are welcome to look at
7 the transcript, if you want, if you want to see
8 it, but I'm just going to read a little section.

9 A. I'll accept your reading.

02:49:48 10 Q. This is John Martin, "And one thing
11 smokers are supposed to get is nicotine. That
12 was made clear decades ago by a Philip Morris
13 official. He wrote this confidential internal
14 memo, think of the cigarette pack as 'a storage
15 container for a day's supply of nicotine,' think
16 of the cigarette as 'a dispenser for a dose unit
17 of nicotine,' think of a puff of smoke as 'the
18 vehicle of nicotine.'"

19 Do you remember that, generally, from
20 what you reviewed?

21 A. I mean, generally, I remember Bill
22 Dunn's name, and generally I remember remarks
23 like that.

02:50:32 24 Q. Do you recall if you ever saw the, or
25 any, memorandum that he wrote that contained

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1 Lilly

2 those quotes or those references to nicotine
3 dispensers, or nicotine vehicles?

4 A. I don't remember ever reading those
5 things written by Bill. But he really wasn't a
6 confidant of mine in the early days I was there,
7 I will say.

02:51:24 8 Q. How did you prepare for this
9 deposition?

10 MR. MURPHY: I object. The witness
11 can answer a proper question, but I think that
12 question is too broad.

02:51:34 13 Q. Apart from discussions you had with
14 your counsel --

15 A. Yes, sir.

02:51:38 16 Q. -- what did you review in preparation
17 for your deposition today?

18 A. I did see the Day One tape, and I did
19 look at several documents, no more than three or
20 four, if I recall, and I spent some time with
21 Barbara and David.

02:52:02 22 Q. Do you recall the documents you
23 reviewed?

24 A. I was going to say I have a lousy
25 memory, but one of them was the transcript of the

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1 Lilly

2 Day One document. I do believe one of them was
3 one of these earlier ones that I have here.

02:52:20 4 Q. One of the reports?

5 A. One of the research reports. I don't
6 remember the others. There was not very many.

02:52:34 7 Q. Were they your documents or documents
8 that were distributed to you, or do you
9 remember?

10 MR. MURPHY: John, I object. I mean,
11 I think that it is perfectly appropriate for you,
12 as you put a document in front of him, to ask him
13 whether this is a document that he has seen in
14 the course of his preparation, and we have done
15 that with your witnesses and you with ours, but I
16 think that at this point you are fishing around
17 for attorney work product and attorney-client
18 communications in connection with preparation,
19 and I don't think it's appropriate. I think that
20 you have appropriate ways of testing whether or
21 not this witness' recollection has been refreshed
22 by a particular document, as to a particular
23 subject. You can even ask him, when you inquire
24 into a subject without a document, whether he
25 reviewed a document on that subject that

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1 Lilly

2 refreshed his recollection in preparation for his
3 testimony.

4 But I think that this inquiry up
5 front into the preparation sessions is
6 inappropriate. I don't think that Mr. Sax has
7 let ABC witnesses answer questions along these
8 lines. And I'm going to instruct Mr. Lilly not
9 to answer this question.

10 MR. PAYTON: Okay.

02:53:34 11 Q. You accept the instruction?

12 A. I accept my attorney's instruction,
13 yes, sir.

14 MR. PAYTON: I will tell you, Mr.
15 Murphy, I don't think it is inappropriate at all,
16 and it certainly didn't intend to delve into
17 attorney work product, and I have, I believe,
18 asked similar questions, and I think in a
19 similarly low-key way. I understand you
20 instructed your witness. All right.

21 MR. MURPHY: If you want to ask him,
22 John, whether he reviewed any documents that
23 refreshed his recollection on any subjects as to
24 which he has yet testified, I would let him
25 answer that question. If he remembers what he

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1 Lilly

2 reviewed, obviously.

02:54:24 3 Q. Dr. Lilly, you said that you played
4 some role in the ART process. You have described
5 it another way. But do you know what I mean by
6 the ART process?

7 A. I know what ART means, yes.

02:54:36 8 Q. What is ART?

9 A. It means alkaloid reduced tobacco.

02:54:42 10 Q. Did you review documents relating to
11 ART in preparation for your deposition today?

12 A. I don't recall reviewing any ART
13 documents in preparation for today, no, sir.

02:55:34 14 Q. Dr. Lilly, what is your knowledge of
15 Philip Morris' cigarette manufacturing
16 procedures?

17 A. I've never worked in manufacturing.
18 I've been to the plants. I've developed some
19 processes that the plants used. So I'm certainly
20 not an up-to-date expert on manufacturing
21 procedures at all, although I'm not unaware of
22 them, either.

02:56:12 23 Q. For example, how familiar would you
24 say you are with the RL reconstituted tobacco
25 process?

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1 Lilly

2 MR. MURPHY: I object to the form.

3 The witness can answer the question.

4 A. I would say I'm familiar with the
5 overall concept of RL. I would say if you put me
6 in the plant and told me to go to a particular
7 place or vat, I wouldn't know where to go. But,
8 you know, top-line familiarity.

9 MR. PAYTON: Do you want to take
10 about a five-minute break?

11 THE VIDEO OPERATOR: We will go off
12 the record at 2:57:03, on Videotape Number 2, and
13 continue the deposition of A. Cliff Lilly on
14 Videotape Number 3 for June 30, 1995.

15 (A recess was taken.)

16 THE VIDEO OPERATOR: We are back on
17 the record at 3:14:05, continuing the deposition
18 of A. Cliff Lilly on Videotape Number 3 for June
19 30, 1995.

20 BY MR. PAYTON:

03:14:16 21 Q. Dr. Lilly, did you review any
22 documents, on your own, that is, not documents
23 that your counsel showed you, but documents on
24 your own, in preparation for your deposition?

25 A. No, sir, I did not review any on my

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1 Lilly

2 own.

3 (Lilly Exhibit 8 for
4 identification, document entitled "Smoking and
5 Health Program, Status Report, December 1978.")

03:15:10 6 Q. Dr. Lilly, you have been handed
7 what's been marked Lilly Exhibit 8, a report,
8 status report, of the Smoking and Health Program,
9 dated December 1978, of the National Cancer
10 Institute. It has production number PA 640987
11 through PA 611101, or 1003099035 through 9149.
12 It's stamped "Draft."

13 Let me actually tell you why I am
14 showing you this, and also direct you to
15 something.

16 A. Okay.

03:16:06 17 Q. This is a draft report by the
18 National Cancer Institute, and it attaches at the
19 very end a list of --

20 A. I'm sorry. What page?

03:16:32 21 Q. If you go to Appendix A, which is
22 about halfway through, and it says, PA 641031,
23 you will see that there is Appendix A, "Advisory
24 and Consulting Resources," and then it has a list
25 of Smoking and Health Program consultants. Do

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1 | Lilly

2 | you see that?

A. Yes.

03:16:58 4 Q. And you are listed as one of the
5 consultants on page A-3, at the bottom. Do you
6 see that?

A. Yes, I see that.

03:17:16 8 Q. Lilly, Clifford, Philip Morris. I
9 actually don't have specific questions about
10 this. I just want to know if you recall what
11 your role was with respect to the Smoking and
12 Health Program.

13 MR. MURPHY: I object to the form of
14 the question, but you can answer the question.

15 A. Dr. Osdene, I'm not sure I remember
16 the exact date, but Dr. Osdene, who was a member
17 of an industry -- or represented one of the
18 members of industry at NIH, in, I recall, Dr.
19 Gori's
20 See's tenure there in smoking and health, asked
21 me to take a trip with him to one of the
22 meetings, and, if I recall, there was some
23 discussion of aerosol generation and some
24 measurements of aerosol size, and so forth. It
25 was the only trip I ever took there, by the way.
And I assume Tom took me because if something

1 Lilly
2 came up he didn't know about, he wanted me
3 there. I sat in on some of the talks, and I seem
4 to remember that they didn't let me sit in all of
5 them, because I remember standing in the hall for
6 part of it.

7 MR. MURPHY: Just to be clear for the
8 record, is Dr. Geo, who you referred to in your
9 answer, Dr. Lilly, Dr. Geo Gori? Is that the
10 same individual?

11 THE WITNESS: Pardon me, I meant Dr.
12 Gori. I'm sorry.

13 A. That's why I assume my name is listed
14 there. I do remember getting a check from
15 somebody, and, if I recall, I turned it over to
16 Philip Morris because I also got a salary on the
17 day I was going there.

03:19:16 18 Q. Did you play any role in the
19 preparation or review or editing of this report?

20 A. No, sir. This is the first time I've
21 ever seen the report.

03:19:44 22 Q. You were one of the principal
23 scientists at the research center from 1981 to
24 1984. I'm just looking at your resume.

25 A. I did get a promotion in 1981 to

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1 Lilly
2 principal scientist, yes, sir.
03:20:04 3 Q. And in 1984 you became, I take it,
4 what you are now, a research fellow and director
5 of technology assessment?
6 A. Yes. I got promoted to research
7 fellow in '84. I think the title of director of
8 technology assessment was added a couple of years
9 after that.
03:20:24 10 Q. And you described going from
11 principal scientist-research fellow as a
12 promotion?
13 A. It was a promotion in salary grade
14 for me, yes.
03:20:36 15 Q. What's the job description, or what
16 are the responsibilities that you had once you
17 became a research fellow?
18 A. Well, it was the first research
19 fellow job, so I had a little bit of leeway at
20 setting those myself.
03:20:54 21 Q. Was it created for you?
22 A. I'm not sure if it was created for
23 me. I was the first one that got the job.
24 The research fellow was really
25 responsible for insuring that Philip Morris R&D

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1 Lilly

2 was working on suitable technology five and ten
3 years from now that the company would need. It
4 had a responsibility of trying to develop people,
5 and in that regard there were a number of people
6 who were rotated through to work with me. It had
7 a job of representing a lot of the technical
8 functions to outside universities, and in that
9 regard I served on advisory boards for several
10 physics departments in the state and out of the
11 state. And it had a responsibility of being
12 program leader for things that involved new
13 technology that we hadn't been in before.

14 What was added to that with the
15 technology assessment was also the responsibility
16 for not to do the planning, but responsibility
17 that a five-year plan and operational planning
18 was done. And the technology assessment thing
19 reads on, having a responsibility for being aware
20 of what technology is emerging, in or out of the
21 tobacco business.

03:22:46 22 Q. Were you, for example, responsible in
23 any way for potential new products that would be
24 simply nicotine delivery devices?

25 MR. MURPHY: I object to the form of

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1 Lilly
2 the question. I think the question is
3 argumentative. But I also think that there is an
4 issue here, John, as to whether this witness is
5 going to be permitted to testify as to new
6 product development plans with respect to any
7 nonconventional cigarette product. I think the
8 judge's May 17 ruling is clear. I think that
9 ruling contemplates that there will not be
10 discovery of the details of any Philip Morris
11 proprietary research into the area of new product
12 development efforts.

13 If you can ask a narrower question, I
14 will evaluate our position on a
15 question-by-question basis.

03:23:56 16 Q. Dr. Lilly, I'm not attempting to
17 elicit any details, or even at this point the
18 identification of any particular product. I
19 simply want to know if among your
20 responsibilities as a research fellow you were
21 interested in the development of new products
22 that were to be nicotine delivery devices.

23 MR. MURPHY: You can answer the
24 question.

25 A. I don't recall being responsible for

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1 Lilly

2 any product that was intended to be a nicotine
3 delivery device. Any nonconventional cigarette
4 that I've had anything to do with was one that
5 used tobacco. There may be technologies that it
6 may be used in a particular way, but it was
7 always used in tobacco.

03:25:14 8 Q. Are you familiar with concerns about
9 the possible obsolescence of Philip Morris'
10 current product, cigarettes?

11 MR. MURPHY: I object to the form of
12 the question. You can answer the question.

13 A. I mean, you know, the domestic
14 tobacco business goes down a couple of percent a
15 year. The export business goes up 5 or 10
16 percent a year. I think, strategically, anyone
17 in a planning role looks at the business. I
18 don't remember that I looked at it in any
19 concerned way.

03:26:10 20 Q. No, I wasn't asking whether you were
21 concerned. I was simply asking whether or not,
22 as a research fellow, you played a role in either
23 assessing or recommending or developing any such
24 nicotine delivery devices.

25 A. And my answer to that --

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2 MR. MURPHY: I object to the form of
3 the question. I think that misstates your prior
4 question. If you are posing a new question,
5 that's fine, John. But I think that you are
6 asking a very different question now from the one
7 that you asked previously. And I don't think you
8 intend to mislead the witness, but I think that
9 you are skipping back and forth and saying
10 that --

11 MR. PAYTON: I will just ask him this
12 question.

13 MR. MURPHY: Okay.

14 MR. PAYTON: I don't think I was
15 confusing him. But we don't need to argue about
16 it.

03:26:58 17 Q. Here is the question: Whether or not
18 as a research fellow you played a role in either
19 assessing or recommending or developing nicotine
20 delivery devices for Philip Morris.

21 MR. MURPHY: I object to the form of
22 the question. I think the witness has asked and
23 answered that question. Has answered it, excuse
24 me.

25 A. I never played a role or suggested

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03:27:38 6 Q. It is going to be simpler if I simply
7 show you something.

03:28:32 11 Q. Dr. Lilly, you have been handed
12 what's been marked Lilly Number 9?

13 A. Yes, sir.

03:28:44 14 Q. Which is a copy of the Philip Morris
15 U.S.A. R&D strategic plan. It says 1992 through
16 1996, but I understand this to be the 1992
17 strategic plan. Is that correct? They are
18 always five years.

19 MR. MURPHY: I object to the form.

03:28:54 20 Q. Am I right, Dr. Lilly?

21 MR. MURPHY: If the witness
22 understands what he is being asked, he can answer
23 the question.

24 A. In general, we do a five-year
25 strategic plan, and in general most of the

1 Lilly

2 information is for the next year, if that's your
3 question.

03:29:10 4 Q. Well, no, I'm just saying, this is
5 the one that was prepared in 1992, and it shows
6 for five years?

7 A. That's correct.

03:29:20 8 Q. And it is a huge document. It is
9 more than a huge document. This is Volume 2.
10 There is a Volume 1, but I'm only showing you
11 Volume 2, which are the appendices to the
12 strategic plan. If you want to look at the
13 Volume 1 -- okay, you have both things. It goes
14 from PB 218243 through PB 218822, or
15 2021529640 -- I'm sorry, scratch that number. It
16 goes from 2021529526 through 2021530105.

17 MR. MURPHY: Just for the record, the
18 exhibit begins with 9528 and ends at 0105.

03:31:06 19 Q. Dr. Lilly, do you recognize this as
20 Philip Morris U.S.A. R&D strategic plan, 1992?

21 A. I recognize it as that. I didn't
22 realize it was quite so big.

03:31:28 23 Q. This is a document that you routinely
24 receive, that is, the regular strategic plan?

25 A. This is a document that we do every

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1 | Lilly

2 year, and even though I don't write it, I'm
3 responsible for making sure it's written by
4 somebody.

03:31:50 5 Q. Could you just quickly tell me what
6 your role is in connection with the strategic
7 plans?

8 A. Yes. The strategic planning --
9 **were**
10 strategic plans/written in this form started, and
11 again my memory, I think in 1988, maybe '87. And
12 the way it's done -- the role of director of
13 technology assessment has the planning
14 responsibility as part of that job, and the way
15 it's done, to get input from more than just one
16 place at the research lab, there is a planning
17 committee that's formed, and a chairman of that
18 committee appointed.

18 It's the responsibility of that group
19 to do two things: To write a good situation
20 analysis in that year of issues that might face
21 the business, usually done from public sources,
22 and then to write a set of strategic objectives
23 for the laboratory in general, and then from
24 those objectives there is an operational plan
25 done that actually is more resource and budget

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1 | **Lilly**

intensive, and those are the resources we are going to apply against a particular program. And that's done every year. In fact, we are working on the strategic one now. And has been done that way since the late eighties.

03:33:42 7 Q. Are you also responsible for the
8 preparation of the various appendices?

9 A. No. The appendices, as envisioned,
10 are to represent a situation analysis that is
11 supposed to present for that particular time
12 period some array of what the situation
13 surrounding the particular business is, our
14 business, the cigarette business in general.

03:34:20 15 Q. You don't think you play any role in
16 connection with the appendices?

17 MR. MURPHY: I object to the form of
18 the question. You can answer.

19 A. I don't remember ever writing an
20 appendice. In general, the committees did it,
21 you know, as part of the strategic plan.

03:35:54 22 Q. Let me ask that you look in the body
23 of the strategic plan itself, which I believe is
24 simply numbered consecutively, and I would like
25 you to go to page 79. At the bottom of page 79,

1 | Lilly

2 there is an E, Strategic Goal Number 5. Do you
3 see that?

4 A. Yes, I see that.

5 MR. MURPHY: Just to be clear, before
6 we go into the line of questions, John, I know
7 that under the stipulation and protective order
8 there is a presumption of highly confidential or
9 trade secret protection of the deposition
10 transcript pending designations, but I just want
11 to be absolutely clear that this line of
12 questioning with respect to strategic plans of
13 R&D is being designated trade secret, or highly
14 confidential, or both.

15 MR. PAYTON: Yes.

03:37:36 16 Q. And strategic goal number 5 is about,
17 I think, just oversimplified, about new products,
18 vision for the long terms, it says.

19 A. I was trying to look at what the
20 actual goal was. That didn't do me much good.
21 Okay.

03:38:28 22 Q. Go back to page 3. I think the goal
23 is there. I'm not sure it is going to help you,
24 but it's there. Do you see it? It is right in
25 the center of page 3.

1 Lilly

2 A. Yes, it's the vision stuff,
3 futuristic stuff.

03:38:54 4 Q. Develop technologies applicable to
5 future products and processes.

6 A. Yes.

03:39:06 7 Q. And this is a section that discusses
8 various types of new products. They are
9 identified at the top of page 81, just kind of
10 categories. And where I actually want to go is
11 to the last paragraph on 81 that runs over to
12 82.

13 A. Are you looking down at the bottom?

03:39:30 14 Q. Yes. If you want to look at the
15 previous parts, you can, though. It's just a
16 page and a half.

17 A. Just give me ten seconds to look at
18 that.

03:39:38 19 Q. Certainly.

20 A. Okay. You want me to go to 82?

03:40:02 21 Q. We are coming to 82 as well, because
22 on 82 there is a reference to ART.

23 A. Okay.

03:40:10 24 Q. And I want to discuss these two
25 things, ART and this last paragraph on 81, which

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1 Lilly

2 are about nicotine-containing products.

3 As the research fellow, I simply want
4 to know if you were involved in making any
5 assessments with regard to future
6 nicotine-containing products.

7 MR. MURPHY: Without any waiver with
8 respect to the May 17 ruling of the court, I will
9 let Dr. Lilly answer that question.

10 A. I'll tell you what I remember about
11 this.

03:41:14 12 Q. Okay.

13 A. And this, as I say, is a result of
14 lots of people's inputs, representatives from all
15 over R&D, and so forth. There was a concern, at
16 least at the time, and you've got to remember
17 research results and interest goes with timing,
18 when there was large amounts of advertisements in
19 scientific papers, and so forth, about patches
20 and people quitting smoking, and concern among
21 some of our scientists that doctors and the
22 pharmaceutical industry could essentially work
23 with pure nicotine in these things, and should we
24 worry about the sky falling and those products
25 becoming more and more part of smokers quitting

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2 in general or otherwise.

3 I think that's why you see that
4 discussion there.

03:42:32 5 Q. Were these considered competing
6 products?

7 MR. MURPHY: I object to the form of
8 the question. You can answer the question.

9 MR. PAYTON: No, that's a fair
10 objection.

03:42:40 11 Q. Were the products that are described
12 in 81, the bottom paragraph,, transdermal
13 patches, nicotine patches, nicotine-containing
14 products for the smoking cessation market, were
15 these considered to be competing products to
16 Philip Morris' cigarettes?

17 MR. MURPHY: I object to the form of
18 the question. You can answer.

19 A. I'd have to answer in that it was
20 written here that new types of smoking products,
21 I say smoking products, don't have to come out of
22 the traditional competitors. There was concern
23 about the rapid growth of patches. There were
24 concerns about patents coming onto the
25 literature, such as from Procter & Gamble, that

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I think these type of things do concern scientists who have a vision long-term. That doesn't mean that there are lots of programs that immediately get instituted to do these things. I mean, this is a strategic plan that in a way, the 20-year part of it, I wouldn't be surprised to look in here and see room temperature superconductivity or something. That doesn't mean that we could do it, or would do it.

15 But there was a concern of this kind
16 of product coming on the market, and I think
17 that's reflected here.

Q. A lot of these products were already
on the market; isn't that right?

20 MR. MURPHY: I object to the form of
21 the question. I think you can be more specific.

22 But if you understand the question,
23 you can answer it.

24 A. I think I understand the question.
25 Some of them have been on the market for a while,

1 Lilly

2 and there were more of them coming on the market,
3 and the overall sales volume looked like it was
4 beginning to become just not a small so-what
5 thing. I mean, we were talking about hundreds of
6 millions of dollars, that's correct.

03:45:14 7 Q. And these products, and I will try to
8 be more specific, these products, which include
9 products made by Marion Merrell Dow, Ciba-Geigy,
10 Lederle, Farmacia, Warner-Lambert, which include
11 things like patches, Nicorette gum, transdermal
12 nicotine patches, were seen as, at that time,
13 1992, relatively minor competitors?

14 MR. MURPHY: I object to the form of
15 the question. I think it misstates his testimony
16 on this point, and I think it was --

17 MR. PAYTON: No, I'm asking the
18 question. I'm not trying to restate his
19 testimony. I'm just asking the question.

03:45:58 20 Q. Were they seen as minor competitors?

21 MR. MURPHY: Again, I object to the
22 form of the question. You can answer the
23 question.

24 A. I think that what they were seen at
25 as, for the first time in the tobacco business,

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were other companies who were outside the business beginning to get large sales in an area that involved the business, even though it was smoking cessation. And these were in some way diffusion devices that let nicotine into the bloodstream. I think that would be normally viewed the same way as if we went into the chip business and Intel looked at it. I mean, I think it would be a normal type of long-term planning view.

03:46:58 12 Q. Does Philip Morris view itself as
13 being in the nicotine business?

14 MR. MURPHY: I object to the form of
15 the question. You can answer the question, Dr.
16 Lilly.

17 A. Well, the thing that I hear quoted
18 around is that we're in the -- we're not in the
19 tobacco business, we are in the smoke business.
20 I view the company as being in the tobacco
21 business, by the way, but there are people who
22 say we sell smoke.

Q. People in the company that say that?

24 A. Yes, sir.

Q. Do you remember discussions relating

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2 to nicotine inhalers?

3 MR. MURPHY: I object to the form.

4 Is there a time frame on this question?

5 MR. PAYTON: I'm talking about in
6 connection with this strategic plan. It's the
7 next paragraph.

8 A. I remember reading papers in which
9 ~~Pharmacia~~^{Farmaceica} was developing inhalers, or I think
10 nasal sprays is what I actually remember. Yes.

For more information about the study, please contact Dr. Michael J. Koenig at (412) 248-1000 or via email at koenig@cmu.edu.

Q. Nicotine inhalers, nicotine nasal sprays?

13 A. Okay, I see inhaler. I remember it
14 as a nasal spray, if I can remember correctly.

15 Q. I believe there may be two different
16 things, and there may be a nasal spray and there
17 may be an inhaler?

18 A. Yes, sir, I accept that.

03:49:02 19 Q. Without discussing any specific new
20 product or proposed new product at all, I want to
21 ask if Philip Morris has considered expanding
22 into this business.

23 MR. MURPHY: I object to the form of
24 the question. What business?

25 MR. PAYTON: This business of

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2 nicotine aerosols and nicotine inhalers.

3 MR. MURPHY: With that clarification,
4 you can answer the question.

5 A. To my knowledge, Philip Morris has
6 not considered and has no plans of getting into
7 that business.

03:49:36 8 Q. And has Philip Morris considered
9 getting into the business of nicotine patches,
10 nicotine gum, without identifying any particular
11 product or proposed product?

12 MR. MURPHY: Again, I object to the
13 form of the question. You can answer it, if you
14 understand the question.

15 A. I've never heard us talk. I'm not
16 part of New York planning, but I've never heard
17 any talk about us getting into this business, no,
18 sir.

03:50:02 19 Q. Were you part of the process that
20 resulted in this discussion of Strategic Goal
21 Number 5 in this exhibit?

22 A. I certainly have a lot of interest
23 personally in where the company goes long-term,
24 yes.

03:50:24 25 Q. Did you play a role in this section?

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1 Lilly

2 A. I didn't write this. I certainly --
3 I mean, I remember reading parts of this. No, I
4 did not write this.

03:50:48 5 Q. What was the role you played?

6 A. Well, as a member -- we're talking
7 about now, what, '92. In '92, I am part of
8 the -- one of the people who reports to the
9 senior vice president, and so I'm in that regard
10 part of the senior management staff, I suppose,
11 of the laboratory. And part of our
12 responsibility is to encourage and listen to and,
13 you know, get out of the laboratory a strategic
14 plan and an operational plan. And so that would
15 be my role.

16 My responsibility would be that the
17 committee that put this together actually, I
18 would be responsible for making sure the plan got
19 out, but I don't, in fact -- I probably wouldn't
20 be asked to help write it if I know the committee
21 will. But I would be responsible that it got
22 out.

03:52:06 23 Q. Would you have seen it in draft
24 form?

25 MR. MURPHY: I object to the form of

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2 the question. Are you asking him did he, or
3 would he, or which?

Q. Did you see this in draft form?

5 A. I don't remember seeing it all in
6 draft form. I would certainly have seen a draft
7 before the final total thing.

03:52:40 8 Q. I'm at the bottom of page 81. Just
9 go back one page.

A. Page 81, okay.

Q. The paragraph I was directing your attention to that begins, "The next type of product to be discussed, a product which can provide tobacco flavor and impact in an aerosol form is of considerable current significance."

A. I'm having trouble finding that.

03:53:02 17 Q. It's the last paragraph on page 81.

18 A. Oh, it's up here, sorry. I was
19 looking at the last sentence.

03:53:08 20 Q. Do you see that? It say, "The next
21 type of product to be discussed, a product which
22 can provide tobacco flavor and impact in an
23 aerosol form is of considerable current
24 significance."

25 A. I see that.

1 Lilly

03:53:24 2 Q. "Our business is gradually but
3 certainly changing." Do you see that?

4 A. Yes, sir.

03:53:30 5 Q. Does Philip Morris expect that its
6 role in this business is changing as well, and is
7 it considering -- I will ask them one at a time.
8 Is it considering getting into the business of
9 developing an aerosol product? I'm going to ask
10 those one at a time, but I want you to hear the
11 whole thing.

12 A. Okay.

03:53:54 13 Q. Is Philip Morris' role in this
14 business changing?

15 MR. MURPHY: I object to the form of
16 the question. I think it's vague and ambiguous.
17 I don't think that you have specified what the
18 business that you are talking about is. If the
19 witness has an understanding, he can answer the
20 question, but I think it would be simpler to
21 reframe it.

22 A. I don't have a feeling of what was
23 meant by that sentence.

03:54:22 24 Q. Do you know if Philip Morris was
25 considering developing an aerosol product, as is

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1 Lilly

2 discussed in the bottom paragraph here?

3 MR. MURPHY: I object to the form of
4 the question. You can answer.

5 A. Philip Morris was active in, you
6 know, nonconventional cigarette products, and I
7 want to stress cigarettes, because they all
8 derived, everything, flavors and nicotine, from
9 tobacco. Those looked a little funny, but they
10 were -- they did deliver a smoke aerosol. And
11 without getting into the details of those, they
12 started, you know, many years ago, and there was
13 lots of resources spent in after the Premier came
14 out because there was lots of worry about
15 competitive advantage. And that fundamental
16 research and development goes on today.

17 I wouldn't characterize any of these
18 as nicotine delivery devices. I would
19 characterize them as a little different looking
20 ways to heat tobacco and derive a smoke aerosol,
21 that in some cases would contain nicotine, and in
22 some cases used denic and didn't contain
23 nicotine.

03:55:54 24 Q. The products that are referred to in
25 the paragraph at the bottom of 81, that are

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8 MR. MURPHY: I object to the form of
9 the question. You can answer the question.

10 A. I mean, I think they're transdermal
11 nicotine patches. I mean, from my knowledge of
12 it, yes.

Q. That's a nicotine delivery device?

14 MR. MURPHY: I object to the form of
15 the question. You can answer.

16 A. It certainly diffuses nicotine across
17 a membrane, I mean, when you put it on your arm.
18 That's correct.

03:57:00 19 Q. Dr. Lilly, let me ask you to go to
20 the appendix that I believe relates to this
21 section, and it is --

22 A. If you give me a hand, I will try to
23 find it.

03:57:12 24 Q. I am going to direct you to it. It
25 is PB 218597.

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2 A. 2185 - -

03:57:20 3 Q. 97. And it's about, I don't even
4 know how to estimate this, a third of the way
5 through the rest of it. It says Appendix J.

6 A. I'm laughing about who would have
7 read this.

03:57:50 8 Q. I have to raise my hand.

A. 8548. I'm slowly getting there.

03:57:58 10 Q. 218597.

11 A. I'm still not there yet. Sorry.

12 Excuse me for my slowness.

Q. It's the number at the bottom.

14 A. I've got a --

03:58:30 15 Q. You're right, sometimes they are on
16 the side and sometimes at the bottom.

17 A. 218593, 218594, 95, 96. Okay.

03:58:46 18 Q. Now you are at Appendix J, which is
19 entitled "Smoking Cessation," it's misspelled,
20 but it's "Smoking Cessation, Nicotine Delivery
21 Devices." Do you see that?

22 A. Yes.

03:58:58 23 Q. And you open to the actual text,
24 "Smoking Cessation, Nicotine Delivery Devices.

25 A. Okay.

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Lilly

03:59:08 2 Q. Do you remember having seen this term
3 in any of these reports, nicotine delivery
4 devices?

5 MR. MURPHY: I object to the form of
6 the question. You can answer it.

7 A. Well, what the appendices are
8 supposed to do is to give the reader some feeling
9 of the situation that exists in markets, you
10 know, that could be interesting to tobacco
11 planning. And I do think I remember seeing this
12 in there and read it as simply that, an
13 information thing about what was happening in the
14 nicotine, you know, or the smoking cessation
15 business.

04:00:04 16 Q. If you want to look through this, you
17 can. I think it goes over almost the same kinds
18 of -- it is almost the same paragraph.

19 A. If you don't mind, I will take a few
20 seconds.

04:00:14 21 Q. Go ahead. It's four pages.

22 A. Okay, I looked it over.

04:01:42 23 Q. Do you remember seeing this before,
24 Appendix J?

25 A. I certainly remember that it was in

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1 Lilly

2 this report. I couldn't testify to you that I
3 read every word of this, of, in fact, the
4 appendix at all.

04:02:00 5 Q. Does the appendix come to you in
6 draft form?

7 A. I remember that the decisions and
8 drafts that we would normally look at more would
9 be the actual strategic plan that we had to put
10 resources around. The appendix is the spirit of
11 it, to be kind of an encyclopedia type thing.

04:02:28 12 Q. With regard to this specific
13 appendix, Appendix J, do you know who would have
14 been responsible for drafting this?

15 MR. MURPHY: I object to the form.
16 You can answer.

04:02:40 17 Q. Do you know who was responsible for
18 drafting this?

19 A. Yes, I understand your question. I'm
20 trying to -- I don't know exactly. There's a lot
21 of knowledge there of a particular kind. It
22 would be -- I remember who the chairman of the
23 committee was.

04:03:12 24 Q. Who was that?

25 A. It's a gentleman named Ted Sanders.

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04:03:18 2 Q. Who is Ted Sanders?

A. Ted Sanders is a Ph.D. organic chemist I.

04:03:30 5 Q. He is a scientist in the research
6 center?

7 A. Yes, he is a scientist in the
8 research center. He just returned to the
9 research center, if I can add that. He was a
10 director of research for PM Europe for three
11 years.

04:03:54 12 Q. This would have been done under
13 either his supervision, or that's the way you
14 remember this?

15 A. I remember -- Ted Sanders actually
16 reported to me, and I remember that he was the
17 chairman of the strategic planning group as his
18 last job reporting to me before he went to PM
19 Europe. And he just came back.

04 : 04 ; 24 20 | On . He has just come back .

21 A. That's my surmise as to who was
22 chairman of the planning committee.

04:04:42 23 Q. Would you go to the third page of the
24 actual text. It is PB 218600. At the top it
25 says D. Efficiency.

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MR. MURPHY: Efficacy.

Q. Efficacy. Yes, I'm looking at that.

04:04:58 4 Q. If you go to the bottom, it says "E.
5 Products of the Future." Do you see that?

A. Yes, sir, I see that.

04:05:02 7 Q. Do you see the first sentence of that
8 section reads, "Prevailing wisdom suggests that
9 since smokers smoke in order to obtain nicotine,
10 that any method which introduces nicotine through
11 a noncigarette product will assist a smoker in
12 giving up cigarettes."

13 A. I hear that. I see that.

04:05:22 14 Q. Do you agree with that?

15 MR. MURPHY: I object to the
16 question. I think you should read him what
17 follows that statement.

Q. "Whether or not this is true --" I'm
reading what follows. "Whether or not this is
true is not a relevant issue for PM U.S.A. What
is relevant is that people believe it to be
true. What is also relevant, however, is that
two types of nicotine-containing smoking
cessation aids currently are about to be marketed
in the U.S. do not introduce nicotine in an

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2 | efficient manner."

6 MR. MURPHY: I think you should
7 continue, John. I think that if you are going to
8 ask him a question about this section, that you
9 should put the entire section in the record.

10 MR. PAYTON: He can read the rest of
11 it.

12 MR. MURPHY: You are taking it out of
13 context.

14 MR. PAYTON: He can read it.

04:06:10 15 Q. Read it.

16 A. You want me to read it?

04:06:12 17 | Q. Sure.

18 A. Starting with "A device," is that
19 where you left off?

04:06:16 20 Q. Sure.

21 A. "A device which would introduce
22 nicotine efficiently would be an aerosol delivery
23 device. There is definitely some activity in
24 this area, although it may be a while before any.
25 attempts are made to market such a product. Kabi Kave

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Pharmacia has purchased technology developed by Advanced Tobacco Products relating to an aerosol delivery device. In addition, there are a number of U.S. patents dealing with this type of article, U.S. 4,945,929, U.S. 4,715,387, and U.S. 4,635,651, the first of which was granted to BAT, British American Tobacco Company."

9 MR. MURPHY: Keep reading, Dr. Lilly,
10 the rest of this section, please.

11 A. Okay. "What is the prevailing
12 opinion of health authorities regarding nicotine
13 delivery devices? A quote from a recent
14 editorial in the influential British medical
15 journal Lancet suggests that the opinions might
16 well not be negative. Although these nicotine
17 replacement products are marketed as aids in
18 stopping smoking --" this is a quote, by the way,
19 I'm sorry -- "with further refinement some may
20 also have potential for long-term use, and if
21 permitted might eventually replace tobacco in the
22 open market." A series of dots. "It seems
23 logical to offer either a cleaner product than a
24 cigarette," "a cleaner product" in brackets,
25 "than a cigarette, or better still an acceptable

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2 source of more pure, less contaminated nicotine.
3 This principle is the same as that of the UK low
4 tar program, a gigantic step - too big it seems
5 for regulatory authorities and health
6 professionals in the U.S.A."

7 End of quotation.

8 THE WITNESS: Do you want me to
9 continue?

10 MR. MURPHY: Yes.

11 A. Sure. Read the last paragraph.

12 A. "If attitudes expressed above become
13 widespread among health professionals, it will
14 not be too long before nicotine delivery devices
15 which are both effective and appealing are
16 introduced into the market with endorsement.

17 Should this happen, it will clearly become the
18 next wave in the cigarette market," "cigarette"
19 in quotation, "driven by health concerns. If PM
20 U.S.A. is not prepared to participate in this new
21 market, it is possible that the repercussions
22 would be severe."

23 I read the whole thing.

04:09:20 24 Q. Dr. Lilly, looking at this whole
25 section E, those three paragraphs, do you recall

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2 having any discussion about this section?

3 A. You know, I really don't. And, in
4 fact, I'm glad you asked me to read it. I had
5 not read the details of that. Thank you. But,
6 no, I don't recall great discussion on this, at
7 least not with myself.

04:09:46 8 Q. Go back to the first sentence.

9 A. Okay.

04:09:50 10 Q. It's on the previous page, which
11 begins, "Prevailing wisdom suggests that since
12 smokers smoke in order to obtain nicotine." Do
13 you see that?

. 14 A. Yes, I see it. I'm looking at that.

04:10:02 15 Q. Are you there?

16 A. I'm there.

04:10:12 17 Q. Did you agree with that?

18 A. I don't know -- in general, I don't,
19 but I don't know what the prevailing wisdom that
20 whoever wrote this is talking about. It's very
21 similar to the discussions I had with Bill Dunn
22 earlier.

04:10:28 23 Q. It is.

24 A. I'm not sure it's prevailing wisdom,
25 but I will certainly accept that there's some

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2 papers in the literature that say that that's
3 true.

4 MR. MURPHY: I move to strike
5 counsel's editorial remark.

6 MR. PAYTON: What was my editorial
7 remark? That it is similar to the discussions
8 that he had with Bill Dunn?

9 MR. MURPHY: Yes.

10 MR. PAYTON: Okay, it is similar to
11 his description of the discussions he had with
12 Bill Dunn.

13 MR. MURPHY: I don't think that was a
14 description, John. I think that was just an
15 editorial comment. The record will speak for
16 itself. **MR. PAYTON: All right.**

04:11:10 17 Q. Dr. Lilly, do you know if this
18 sentence, which reads, "Prevailing wisdom
19 suggests that since smokers smoke in order to
20 obtain nicotine," do you know if that is the
21 prevailing view at Philip Morris, that smokers
22 smoke in order to obtain nicotine?

23 MR. MURPHY: I object to form of the
24 question. You can answer it.

25 A. I certainly don't know if that's a

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2 prevailing view. I just don't.

04:11:50 3 Q. And having read these three
4 paragraphs, do you now recall any more about
5 whether or not Philip Morris has considered
6 participating in this market of nicotine delivery
7 devices?

8 MR. MURPHY: I object to the form.

9 You can answer it.

10 A. I mean, reading these, I still know
11 of no work or any idea of commercializing
12 anything like this. I mean, not to take away
13 that we are interested in nonconventional
14 cigarettes.

04:13:50 15 Q. Dr. Lilly, we are not going to have
16 enough time to actually launch off into a whole
17 other subject, but I would like to ask you if you
18 could just generally describe for me what role
19 you played in developing or working on the
20 development of the ART process.

21 A. Okay. I'll try to do it as
22 completely as I can.

23 Can I put a couple of historical
24 things in before I start?

04:14:24 25 Q. Please do.

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2 A. I was familiar when I first came to
3 the company from the oil business in '65 that
4 there had been research work going on with ~~both~~
5 methylethyl ketone and methylene chloride to take
6 nicotine -- extract nicotine from tobacco, and no
7 or low nicotine tobacco. I also remember some
8 work of ammoniation and steam stripping to remove
9 nicotine from tobacco. So there was an interest
10 before I got to the company in taking nicotine
11 out of tobacco. I don't know where it came from
12 or what the strategy was, but there was an
13 interest.

14 In December of 1985, Philip Morris,
15 combined with or bought, I say -- the food people
16 don't like us to say bought, but combined with
17 General Foods, and one of the first visits at
18 meeting the people in the food research business,
19 or in any regard, I think was to get the two R&D
20 groups together. And in that regard, Frank
21 Resnik, who was the president of Philip Morris
22 U.S.A., did host a visit from the management
23 group at General Foods research in Tarrytown, New
24 York, and Dr. Hausermann and his replacement, Dr.
25 Ken Houghton, hosted a group of their reports, of

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2 a
3 which I was a member, to first ~~at~~ dinner, in
4 which we met each other, and in a series of talks
5 that gave them a feeling of our technology and
6 gave us a feeling of their technology.

7 And one of the best talks, and one of
8 the most enlightening scientifically, to
9 certainly me, was a talk given by Dr. Tom
10 Fassina, who unfortunately he has passed away a
11 couple of years ago, on how supercritical
12 extraction worked in coffee in Bremen, Germany,
13 and how they were building a supercritical
14 extraction plant in Houston, Texas.

15 When the new vice president, Ken
16 Houghton, took over, and Max Hausermann returned
17 to Switzerland, which was on January 1 or January
18 2, in one of our first staff meetings Ken
19 expressed the interest that we should really
20 think about programs in two areas. One area was
21 paper development to reduce cigarette
22 sidestream -- I don't have a cigarette but, you
23 know, the sidestream that comes from the
24 burning -- and the second was a real study as to
25 whether supercritical CO-2 would be a better way
 and could lend to a no-nicotine product better

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2 than previous attempts. And then, much to my
3 surprise, he turned to me and said, "That sounds
4 like a project, Cliff, you should do."

5 Now, this was in January. And
6 starting it slowly -- we had thought about
7 building a one-liter system, not particularly
8 for -- for chemistry, not particularly for
9 removing nicotine. I had two people early, one
10 was Harvey Grubbs and the other one was a
11 chemical engineering named Fran ~~Eutsch~~ and along
12 with our director of process development, whose
13 name is Don Knudson, or whose name was Don
14 Knudson then, he is now director of quality
15 assurance, we took a visit to the Hoboken plant
16 of Maxwell House, and we talked about
17 supercritical extraction with Dr. Fassina and
18 some of his engineers. And at that meeting he
19 offered a small system that was in the research
20 labs at Tarrytown. It turned out to be 14
21 liters, to be exact.

22 And so we went up and took some
23 tobacco, and I do remember what we took, we took
24 some all-burley, we took some all ~~pre-cured~~, and
25 we took some oriental, and we ran a set of

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2 experiments, which took enormous time, because
3 the system was very small and it didn't have a
4 good way of circulating the supercritical CO₂
5 through. And we had no way to measure how much
6 nicotine we got out, so we ran it for 20 or 30
7 hours. But we did bring some tobacco back,
8 enough that there was some hand-made cigarettes,
9 and I remember smoking them, and I remember I
10 couldn't tell whether they were good or not. I
11 mean, I just couldn't take a hand-made cigarette
12 and tell whether it was good or not.

13 We talked to Dr. Fassina and to his
14 boss, who is a guy named Rick Guardia, vice
15 president of research at General Foods, and they
16 said, "We'll see if we can get you some
17 experimental trials at our pilot plant at Kaffee
18 Hag in Bremen, Germany, and they did manage to do
19 that, and we visited the German facility. And
20 I'm talking now late April, early May of 1986.

21 We worked out with them and gave
22 them, you know, some suggestions of how we would
23 like it changed, because it had been used with
24 coffee beans and not tobacco.

25 We then went there with a little

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2 bigger bunch of people. I think we took ten or
3 twelve people, who were mostly scientists and
4 engineers, on our next visit there, which was the
5 end of May in '86. And we had a well-thought-out
6 experimental plan. We did ask the Philip Morris
7 lab in Neuchatel, Switzerland, to contribute some
8 analytical ~~help~~^{people to} in that effort, and one
9 processing engineer, and the Kaffee Hag people
10 contributed some of their scientists then, and in
11 particularly a lot of their technicians who ran
12 that facility.

13 We ran a bunch of experiments, as
14 many as we could fit in there. The German
15 government, since we were extracting nicotine,
16 made us work when they closed down, so when they
17 closed down at 5, we worked from 5 until 5 in the
18 morning. They required us to have a doctor on
19 hand, which we did.

20 That system, I think it was 140
21 liters, but accept that as an estimate, they used
22 in the coffee business, when they take out of the
23 green beans, they supercritically extract, they
24 had used a pressure of 3800 pounds per square
25 inch, and in circulating the supercritical fluid

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2 around and around, they brought it through a
3 large carbon bed, which essentially removed
4 everything in solution, which for the green beans
5 was not a bad idea, because the roasting
6 technique would bring back the flavors from
7 roasting because they were done green.

8 We used the same setup on a smaller
9 scale for the pilot plant. And in that case we
10 were talking about 14 or 15 hours. And we found
11 with the carbon we were essentially removing 10
12 to 15, 20 percent of the total material, because
13 there was just no selectivity at all. Everything
14 that came through came out on the carbon.

04:24:00 15 Q. It wasn't nicotine-specific, you
16 mean?

17 A. No. In fact, the supercritical
18 extraction is not nicotine-specific, nor is it
19 wax-specific or even caffeine-specific. It goes
20 after compounds that are in a certain volatility
21 range, and you have to build the specificity into
22 the process.

23 That tobacco out of that trial was
24 absolutely terrible. I will personally testify
25 to you that it was terrible, because I could not

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2 smoke it. Okay?

3 We knew we had to get rid of carbon,
4 so we went back at the end of that summer, in
5 '86, with another trial. These trials would
6 last anywhere from four to six weeks. And there
7 we did experiments with several things. We did
8 experiments with cloth, we did experiments with
9 ground-up coconut shells --

04:25:10 10 Q. This is as a receiving medium?

11 A. Yes. I mean we kept the thing over
12 here the same, where we would pump CO-2 through.
13 What we were trying to do was have a better
14 medium that we could lower the losses out of the
15 thing.

16 Finally, one of the scientists at
17 Kaffee Hag said, you know, what you've got to do
18 is reach some sort of equilibrium and you
19 aren't. You're taking everything out of here,
20 which means on the next pass through you get
21 everything back in there. And so we began to
22 look at things like cellulose, and plant
23 materials. And we finally -- we looked at
24 ground-up good tobacco, which didn't make any
25 sense.

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2 We final finally determined, if we
3 used stems that had some of the same chemistry as
4 the tobacco we were trying to extract, that you
5 could reach an equilibrium in which the amount
6 that the CO-2 stream could carry in that
7 particular compound was so that there was no net
8 movement out of the tobacco or into the stems.
9 It was an equilibrium.

10 We then were able to cut our losses
11 in materials a lot. Then we --

04:26:36 12 Q. Let me stop you. What was happening
13 there, that by having an equilibrium in --

14 A. Yes, by having a stream that's
15 saturated in a particular compound, let's say a
16 tobacco wax, that may also be in the stems and in
17 the tobacco shreds, so you can take 1400 parts
18 per million in the CO-2 stream. Once that was
19 reached, by coming from both places --

04:27:10 20 Q. You stopped extracting it?

21 A. You stopped extracting it. It was an
22 equilibrium.

23 That did lead -- those tobaccos
24 coming back led to somewhat better subjectives,
25 and immediately then the experiment turned out to

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2 be that we actually put citric -- potassium
3 citrate on the stems, and there we were trying to
4 create a sink, a place where nicotine would
5 normally want to go, and that worked pretty well
6 and gave us some specificity with the rest of
7 equilibrium.

8 Now, these experiments were taking a
9 long time, they were taking at the beginning of
10 our work 16 hours, which was a very long time,
11 because it went into the time we weren't supposed
12 to be extracting. And we ended up with one of
13 the engineers in the laboratory, where we had a
14 very small, almost the size of this cup, system,
15 saying that he had found that ammonium
16 bicarbonate put onto the tobacco that was being
17 extracted was able to double his rate of
18 extraction and take it from a real long time,
19 like 16 hours, to something that made more sense
20 commercially.

21 On our next trip there, we did that,
22 ammonium bicarbonate being interesting because
23 half of it goes to CO-2, the bicarbonate part of
24 it, and then you had some ammonia, which did end
25 up partially on the stems and partially in the

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2 filler.

3 That gave us things that began to
4 make sense commercially, because they were now
5 six or seven hours. Use of the stems gave us,
6 you know, losses that we were able, by being very
7 careful, to get down below 1 percent.

8 And then the tobaccos, I remember
9 very well in the trip there in January of '87,
10 began to, at least in our minds, at least from a
11 comparison, began to taste a lot better. Those
12 tobaccos were either sent back or carried in
13 suitcases. There wasn't a lot of this tobacco.
14 Or put on planes. The stems that were used there
15 were stored and eventually shipped back on a boat
16 and actually run through our normal like disposal
17 of chemical people.

18 And I can't give you any more details
19 on that because I simply don't know the details
20 of that.

04:30:10 21 Q. Why did you bring the stems back?

22 A. We didn't want to leave them over
23 there. Kaffee Hag didn't know what to do with a
24 bunch of tobacco stems. And if you know the
25 German government, there's got to be a

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2 regulation, you know, for throwing away anything,
3 so we didn't know what to do.

4 The final development of the process
5 was in the May -- April-May time period, June, of
6 1987, and there the intent was to take blends,
7 like Marlboro blend, you know, or other blends of
8 burley, bright and oriental, and simply try to
9 make more of them, so that they could be used in
10 actual tests to make cigarettes, so that they
11 weren't just things that had to be hand-made,
12 they would be, for instance, 30 pounds, where you
13 could use them on a maker.

14 And so the last experiment was one of
15 just gritting our teeth and just doing kind of
16 production that we could do on that machinery.

17 We left some people there to go
18 through and clean up the system and do wipe tests
19 and make sure we didn't leave nicotine anywhere,
20 which we didn't, so they could go back to the
21 coffee business.

22 My last trip there was at that time
23 period. And we came back and turned the product
24 development part of the project over to people in
25 product development.

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That in my -- at least in my boss' mind, ended my part of being the leader of the process development.

5 That's as complete as I can
6 remember.

7 MS. ROBBINS: And it's 4:30.

16 THE VIDEO OPERATOR: The deposition
17 of A. Cliff Lilly will adjourn at 4:32:17 on
18 Videotape Number 3 for June 30, 1995.

19 (Time noted: 4:32 p.m.)

ARNYS CLIFTON LILLY, JR.

22 Subscribed and sworn to before me,

23 this 26 day of March, 1995.

24
25 Wilfred J. Weddey

~~My commission expires~~ 10/31/98

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1 Lilly

2 C E R T I F I C A T E

3 STATE OF NEW YORK)

4 : ss.

5 COUNTY OF NEW YORK)

6
7 I, JACK FINZ, a Certified Shorthand
8 Reporter and Notary Public within and for the
9 State of New York, do hereby certify:

10 That ARNYS CLIFTON LILLY, JR., the
11 witness whose deposition is hereinbefore set
12 forth, was duly sworn by me and that such
13 deposition is a true record of the testimony
14 given by the witness.

15 I further certify that I am not
16 related to any of the parties to this action by
17 blood or marriage, and that I am in no way
18 interested in the outcome of this matter.

19 IN WITNESS WHEREOF, I have hereunto
20 set my hand this 1st day of July, 1995.

22 
23 JACK FINZ, C.S.R.

24
25

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1	Lilly	
2	E X H I B I T S	
3	DESCRIPTION	PAGE LINE
4	(Lilly Exhibit 1 for identification, curriculum vitae of Mr. Lilly.).....	8 12
5	(Lilly Exhibit 2 for identification, Philip Morris Research Center report entitled "Tar, Nicotine, and Smoking Behavior.").....	56 2
6	(Lilly Exhibit 3 for identification, Philip Morris Research Center report entitled "Puffing Behavior on High and Low Delivery Cigarettes.").....	68 25
7	(Lilly Exhibit 4 for identification, Philip Morris Research Center report entitled "Behavioral Research Annual Report.").....	89 22
8	(Lilly Exhibit 5 for identification, inter-office memorandum from W.L. Dunn to H. Wakeham, dated January 21, 1974.)..	110 25
9	(Lilly Exhibit 6 for identification, letter dated July 12, 1974, to Dr. Max Hausermann, from Robert B. Seligman.)....	131 8
10	(Lilly Exhibit 7 for identification, inter-office correspondence to W.L. Dunn from F.J. Ryan, dated August 16, 1974.).....	137 19
11	(Lilly Exhibit 8 for identification, document entitled "Smoking and Health Program; Status Report, December 1978.")	
12	152 2
13	(Lilly Exhibit 9 for identification, Philip Morris U.S.A. R&D Strategic Plan, 1992 through 1996.).....	160 7
14		
15		

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